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The Influence Of *Accelerated Learning Cycle* On Junior High School Students' Mathematics Connection Abilities

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Abstract

This research examined students' mathematics connection abilities through the implementation of *Accelerated Learning Cycle*. Mathematical connection is important competence which should be include in goal of national mathematics education. *Accelerated Learning Cycle* with learner preparation phase, connection phase, creative presentation phase, activation phase, and integration phase, are expected to be able to enhance that skill.

This quasi-experiment study is conducted toward students who are studying in Junior High School Grade 8 at Pekanbaru, Riau. This study is represented by two classes. Students of experiment class get instructional by using *Accelerated Learning Cycle*. On the other hand, students of control class get conventional instruction. There are post-test as the instruments to investigate the students' ability on mathematical connection. The analysis of data utilized Mann-Whitney test and one-ways ANOVA

The results showed students' mathematics connection abilities of the experiment class was better than the control class for all the students and for students in all KAM (initial mahematical abilities) categories, for the high and middle KAM categories there was no difference on their mathematical connection ability.

Keyword : *accelerated learning cycle, mathematical connection*

A. INTRODUCTION

The Human Development Index (HDI) in 2011, about the data quality of the human resources of the countries in the world, Indonesia was ranked 124 of 187 countries, lower than Singapore (26), Brunei Darussalam (33), Malaysia (61), Thailand (103), and the Philippines (112). Indonesia has not reached top five South-East Asia to life expectancy, literacy, education and standards of living. Mathematics as a basic science taught at every level of education, a strong role in the development of science and technology as well as everyday life.

Department of National Education in 2006 stated that the study of mathematics equips students to have the ability to think logically, analytical, systematic, critical and the ability to work together. Learning of mathematics in elementary school through high school in the Kurikulum Tingkat Satuan Pendidikan (KTSP), aims to enable students to have the competencies: (1) understand the mathematical concepts, explains the relationship between concepts and apply the concepts or algorithms, flexibly, accurately, efficiently and appropriately in problem solving; (2) using the reasoning patterns of nature, and mathematical manipulation in making generalizations, compile evidence, or explain mathematical ideas and statements; (3) solve problems that include the ability to understand the problem, devised a mathematical model, complete the mathematical model, solve the model and interpret the obtained solution; (4) communicate ideas with symbols, tables, diagrams or other media to clarify the situation or problem; (5) has a respect for the usefulness of mathematics in life, namely to have curiosity, attention, and interest in studying mathematics and tenacious attitude

and confidence in solving problems; (6) have the ability to think logical, analytical, systematic, critical, creative and have the ability to work together.

Students are required to explain the relationship between concepts of mathematics, other sciences, as well as everyday life. The linkage means relationship or connection. The purpose of learning mathematics is directed so that students have good mathematical connection abilities.

Many students tend to shy away from math. Trends in International Mathematics and Science Study (TIMSS) (2007) reported the results of the survey that the ability of eighth grade math students, Indonesia ranks 36 out of 56 participating countries with the acquisition of 397 flats under the average international scale (maximum 500). Acquisition of Indonesia in 2007, down from the previous TIMSS data acquisition flats. Malaysia get the average acquisition under international mean, but Malaysia only lack 26 points to reach the international mean.

Mathematical skills of students and Indonesia ranked 61 of 65 in the study Programme for International Student Assessment (PISA) (2009). Mean Indonesia is located on the 371 flats under international 496. Mathematical connection ability was not uplifting describe. The poor ability to associate mathematical concepts into the realm of other mathematics, other sciences realm, and the realm of life, has been declared by Yuniawatika (2011) and Qohar (2010).

This may be caused by several factors, including: our students are accustomed to meet routine matters; students frequently tested questions that are understanding, while for the matter of that nature specifically examined the ability of mathematics rarely granted, so when students meet problems that are demanding higher levels of thinking ability (high order thinking), our students are surprised; we are less accustomed to linking student learning material with material that has been accepted previously, learning outside of mathematics, even everyday life; and learning in the classroom is merely using conventional learning.

Conventional learning is not necessarily bad. Students want to have something new in each learning activity. Conventional learning makes learning in teacher-centered. This is contrary to the government's stated desire on the Indonesian Government Regulation No. 19 Year 2005 on National Education Standards (in KTSP, 2007) which reads:

> "... The principle causes a paradigm shift in the education process, from the teaching paradigm to a learning paradigm. Teaching paradigm that is focused educator role in transforming knowledge to learners in the learning paradigm shift that gives more of a role for learners to develop the potential and creativity of her ... "

The meaning of the principle of National Education Standards above is a change from teacher centered to student centered learning.

One of the learning support is the Accelerated Learning Cycle. Learning principles proposed by the Accelerated Learning Cycle of them; learning involves the whole mind and body, learning is a creative instead of consuming, cooperation can help a good learning process, learning takes place on many levels simultaneously, learning comes from doing the work itself, the positive emotions that help support learning, and

the brain can absorb information directly and automatically. From this principle, the expectations of the implementation of the Accelerated Learning Cycle learning is to enable the meaningful learning and promote the emergence of positive emotions so that students active, agile, passionate, enjoy, and not depressed.

Accelerated Learning Cycle consists of five phases of learning, namely: the learner preparation phase, the connection phase, the creative presentation phase, the activation phase, and the integration phase (Karen Kinard and Mary Parker, 2007). Learning can also optimize on improving students' mathematical connection ability, this is because the mathematical connections can be developed to focus on the second phase of this study, the connection phase.

Problem Formulation

1) Do students who earn Accelerated Learning Cycle learning has the ability to connect mathematical better than students who received conventional learning, in terms of: (a) the entire student?; and (b) the initial mathematical ability?

2) What are the capabilities of students of different mathematical connections between early mathematical ability?

B. METHODS

Design a research plan for this experiment is illustrated as follows:

X O

O

Source : (Ruseffendi, 2005)

Specification:

O: test the ability of students' mathematical connections

X: approach of Accelerated Learning Cycle

The research location was in the one of Junior High School category are contained in Riau Province. The study population was all students in the second semester of eighth grade contained in the Junior High School. Of the population of the two classes were selected as the study sample, the control class class and the experimental class.

Subject matter which was tested Tangents Lines to Circles. Mathematical connection test instrument consists of five questions in the form of a description. The allocation of time to work on this test was 2 x 40 minutes.

C. RESULTS AND DISCUSSION

Summary results of the descriptive analysis of the data connection on both the students' mathematical learning is presented in Table 1 below.

Table 1.
Mathematical Description of Data Connection of Both Student Learning

Control (CL)					Experiment (ALC)				
N	$\bar{X}$	**SD**	***Min***	***Max***	**N**	$\bar{X}$	**SD**	***Min***	***Max***
31	17,03	6,671	8	26	32	22,78	3,160	14	29

In Table 1 above, it can be seen that the mathematical description of the experimental class connection value better than the control class. A summary of the

results of the calculation of the two data paths ANOVA test mathematical connections to early mathematical ability are presented in Table 2.

Table 2.
ANOVA Two Line Connection Mathematical Ability to Early Mathematical Ability

Factor	F	Significance	H_0
Learning (P)	20,636	0,000	Reject
Early Mathematical Ability (K)	2,796	0,069	Accept
P*K	1,696	0,192	Accept

Based on Table 2 it appears that the value of ANOVA test of significance for the two paths of learning factor is less than 0.05, which means that differences in learning have a significant influence on the ability of mathematical connections. In this case, based on Table 1, the experimental class students have the mathematical connection ability better than the control class.

Table 2 shows there is no difference in the ability of mathematical connections for each category of early mathematical ability is different. That is, grouping students based on the categories of high, medium, low and have no effect on the ability of students' mathematical connections. It is marked on the significance value is more than 0.05.

Furthermore, Table 2 also presents the results for a hypothesis in this study design. * Learning factors early mathematical ability showed an interaction effect between learning factors and factors early mathematical abilities to mathematical connection capabilities.

The results of Table 2 states that there is no interaction effect between early mathematical learning and the ability to connect students' mathematical abilities. Learning factors and early mathematical ability factors together do not have a significant influence on the ability of students' mathematical connections.

Summary results of the descriptive analysis of the data connection on both the students' mathematical learning for each category are presented in Table 3 below.

Table 3.
Student Mathematical Description of Data Connection Both Learning for Each Category

Category	Control (CL)					Experiment (ALC)				
	N	$\bar{X}$	SD	*Min*	*Max*	N	$\bar{X}$	SD	*Min*	*Max*
High	9	20,67	6,423	8	25	8	23,62	4,470	14	29
Middle	13	16,85	7,186	8	26	15	22,33	2,992	14	25
Low	9	13,67	4,528	10	24	9	22,78	2,108	18	25

In Table 3 above, it can be seen that the average value of the description of the experimental class students' mathematical connections better than control classes for all categories. Summary of results of test calculations normality of data distribution based on the mathematical connection ability early mathematical ability with the Kolmogorov-Smirnov test are presented in Table 4 below.

Table 4.
Normality Test of Mathematical Ability Connection based Early Mathematical Ability

Category EMA	Control (CL)			Experiment (ALC)		
	Stat	*Sig.*	H_0	Stat	*Sig.*	H_0
High	0,420	0,000	Tolak	0,319	0,016	Reject
Middle	0,266	0,013	Tolak	0,388	0,000	Reject
Low	0,336	0,004	Tolak	0,320	0,008	Reject

H0: The samples come from populations with normal distribution
H1: The samples come from populations that are not normally distributed

Based on Table 4 it appears that the significant value of the mathematical connection capabilities on all categories of early mathematical ability is less than 0.05. As a result, the data equality test mathematical connections to early mathematical ability is done by using a non-parametric test, the Mann-Whitney test. The result of the equality test students' mathematical connection data based early mathematical ability are presented in the following table.

Table 5.
Mathematical Equality Test Data Connection based Early Mathematical Ability

Category EAM	*Mann-Whitney*	Z	*Sig. (2-tailed)*	H_0
High	26,500	-0,937	0,349	Accept
Middle	62,500	-1,647	0,100	Accept
Low	7,000	-2,989	0,003	Reject

In mathematical connection ability, only students with low category better than class experiment, whereas at high and medium categories, the ability to connect mathematical, statistical inferential found no significant differences.

D. CONCLUSION AND RECOMMENDATIONS

Conclusion

1) The ability to connect mathematical students did not differ significantly between early mathematical ability. That is, differences in early mathematical ability was not a significant effect on students' mathematical connection upgrades.
2) There was no significant interaction effect between factors early mathematical learning and the ability to connect mathematical ability.
3) Overall mathematical connection ability students who received learning the Accelerated Learning Cycle approach is better than conventional learning. When you pay attention to early mathematical ability, in the category of early mathematical ability is low, the ability of students to obtain mathematical connection Accelerated Learning Cycle approach is better than conventional learning. As for the high category and were not found significant differences.

Suggestion

1) It should be investigated how the effects of Accelerated Learning Cycle learning against other mathematical ability.
2) This study is confined to the material Tangents Lines of Circles. Expected on other researchers to develop approaches Accelerated Learning Cycle on other learning materials.
3) The research sample taken only two classes so that the results of this study do not necessarily correspond with the school or other areas that have the characteristics and psychology of different students. Other researchers are expected to be able to use a larger sample, with the aim of strengthening the generalization and obtain a more accurate generalization.

E. REFERENCES

Coxford, Arthur F. (1995). The Case for Connection. *Journal of Connecting Mathematics Across the Curriculum*. Editor: House, P.A dan Coxford, A.F. Virginia: NCTM.

Departemen Pendidikan Nasional. (2006). *Kurikulum Tingkat Satuan Pendidikan*. Jakarta: Pusat Kurikulum Balitbang Depdiknas.

_____. (2007). *Panduan Lengkap KTSP (Kurikulum Tingkat Satuan Pendidikan*. Yogyakarta: Pustaka Yustisia.

Kementerian Pendidikan Nasional. (2011). *Instrumen Penilaian Hasil Belajar Matematika SMP: Belajar dari PISA dan TIMSS*. Yogyakarta: Program Bermutu: *Better Education through Reformed Management and Universal Teacher Upgrading* PPPPTK Matematika.

Kinard, K dan Mary Parker. (2007). *The Accelerated Learning Cycle : Are You Ready to Learn? Am I Ready to Lead?*. Proceedings: United States Conference On Teaching Statistics (USCOTS) 2007. http://www.causeweb.org/uscots/uscots07/program/files/breakout2_4.pdf. (diakses 11 Oktober 2011).

Nicolls, Martina.(2004). *A Second Chance: Accelerated Learning in Iraq*. Iraq: Creative Associates International, Inc.

Programme for International Student Assessment. (2010). *PISA 2009 Result: What Students Know and Can Do – Student Performance in Reading, Mathematics and Science (Volume I)*. OECD. http://dx.doi.org/10.1787/9789264091450-en. (diakses 07 Februari 2011).

Qohar, Abd. (2010). *Mengembangkan Kemampuan Pemahaman, Koneksi dan Komunikasi Matematis serta Kemandirian Belajar Matematika Siswa SMP Melalui Reciprocal Teaching*. UPI: Disertasi (Tidak dipublikasikan).

Ruseffendi, E.T. (1993). *Statistika Dasar untuk Penelitian Pendidikan*. Jakarta: Proyek Pembinaan Tenaga Kependidikan Pendidikan Tinggi.

Ruseffendi, E.T. (2005). *Dasar-dasar Penelitian Pendidikan dan Bidang Noneksakta Lainnya*. Bandung: Tarsito.

Sugiyono. (2010). *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Bandung: Alfabeta.

Trends in International Mathematics and Science Study. (2008). *TIMSS 2007 International Mathematics Report*. Boston: IEA.

Yuniawatika. (2011). Penerapan Pembelajaran Matematika dengan Strategi React untuk Meningkatkan Kemampuan Koneksi dan Representasi Matematik Siswa Sekolah Dasar. *Edisi Khusus No.2 Agustus 2011*. ISSN: 1421-565X. (diakses 27 Desember 2011).

http://en.wikipedia.org/wiki/List_of_countries_by_Human_Development_Index. (diakses 29 Desember 2011).